Energy Efficient Vehicle with Antitheft and Accident Control System

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Abstract-*A vehicle has become very important necessity for human. The security of vehicle has become a very important matter of concern. An efficient automotive security system is proposed for anti-theft using an embedded system integrated containing face recognition system with Global Positioning System (GPS) and Global System for Mobile Communication (GSM).This proposed system is an attempt to design and develop a smart anti-theft system that uses face recognition system to prevent theft and to determine the exact location of the vehicle using GPS. GSM system is also installed in the vehicle for sending the information to the owner because GPS system can only receive the vehicle location information from satellites. The owner can also lock or unlock his vehicle with the help of SMS. There is also accident control system which will control speed and not allow the car to dash on the car or obstacle ahead. The least distance is maintained between the cars by matching their speeds. By maintaining the distance collision of vehicles can be avoided. Also, the gases from the exhaust are wasted so the motion of waste gasses from the exhaust pipe is used to generate power to give battery backup for the internal accessories of the vehicle.*

Keywords- Face Detection, Power Generation, Speed Control, GSM, and GPS.

I. INTRODUCTION

These day's almost every person has a vehicle in front of his house. But owning a vehicle also brings responsibility to protect it from every possible danger. One of them is vehicle security. Vehicle theft cases are increasing than any other time. There is need to have some reliable antitheft system for the vehicle. It is a vehicle security gadget that offers fantastic insurance to your vehicle. The main point of the present exploration work is to outline and create a strong security framework for vehicles that can avert robbery and give data on mischances. Antitheft system based on face recognition is very reliable and accurate system. If unauthorized person is identified then the framework sends the SMS to the vehicle holder. After that vehicle manager sends the SMS to GSM modem appended to the controller, issue the important signs to stop the robbery. GPS is commonly used as global navigation system to locate the vehicles and also to stop the vehicle if stolen. The location information is sent in the form of message containing latitude and longitude information to the owner of the vehicle. Today there is increase in traffic anywhere you go. So there is increase in number of accidents, and also due to this increase in traffic vehicles run very close to each other. This results in dashing the vehicle or obstacle in front of the car. To avoid this there is solution provided by this project which will control the car from dashing the car or obstacle in front. The car will maintain safe distance which is set and match the speed of the car in front of it. If the car reaches the set distance the speed will not increase even if you try to accelerate, this will prevent accident. Also there is lots of energy wasted in form of exhaust. This energy is converted in electricity which will charge the battery and provide battery backup to whole system in car. The charging will start as soon as the car gets started, this will give indication on the LCD display. For more comfort of the user and to maintain the battery backup this system is developed. Whenever the car starts it consumes certain amount of voltage and creates voltage drop. This leads to discharge of battery and then the battery needs to be charged. This battery is charged by the alternator but if there is use the internal accessories of car like radio, music, lights, AC, screen, mobile charger etc. for prolonged time then there will be large amount of voltage drop. Battery will require more charging. This will increase the number of charging and discharging times. As the number of charging and discharging times increases the battery life decreases, hence the cost of maintenance increases in return. So energy from exhaust pipe is converted in electricity which will charge the battery and provide battery backup to whole system in car. The internal accessories can operate on second battery and this will minimize the load on main battery.

II. AIM

To develop antitheft system which is based on face recognition, accident control system based on speed control and efficiently utilize the energy from exhaust pipe to provide battery backup.

III. OBJECTIVE

1) To develop antitheft system based on face recognition for more reliability and accuracy.
2) To prevent accident by controlling the speed of car.
3) To generate power from the motion of the gases which are released from exhaust pipe for battery backup.

IV. PROBLEM STATEMENT

1) Today there are many cases of car theft around us and the vehicle owner is not aware of this, So there must be an antitheft system which will inform owner. The antitheft system based on passwords for example is not so reliable.
2) There is huge increase in traffic nowadays which gives invitation to road accidents, so there is need to control road accidents. The accident control systems only inform driver about accident by alarm system and report it.
3) Also lots of energy is wasted from the exhaust pipe of car in form of waste gases. This energy is not utilized in any way so it must be utilized in effective way.

V. BLOCK DIAGRAM

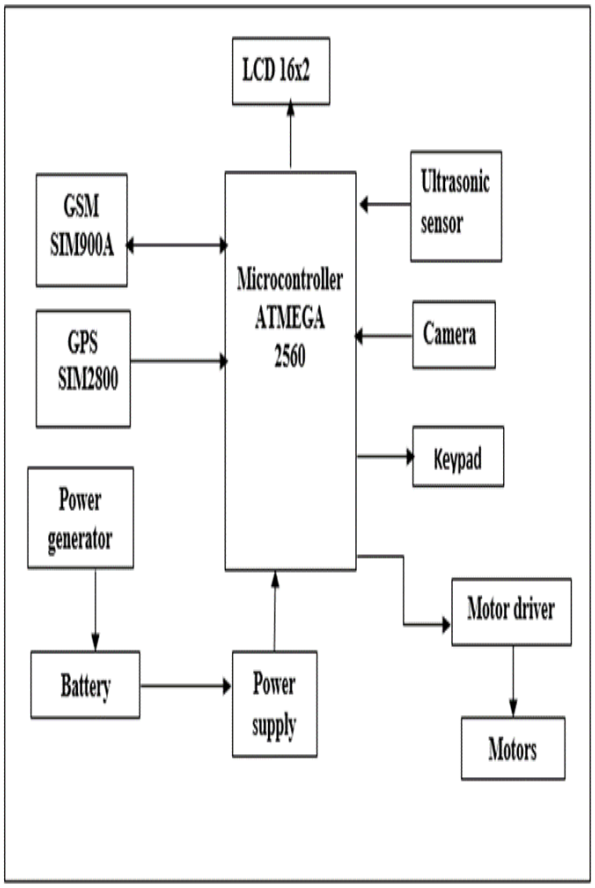

Fig 1. Block diagram of antitheft, speed control and power generation system.

VI. METHODOLOGY AND FLOWCHART

1) In case of theft action:

The antitheft system is based on face recognition. It uses the Local Binary Patterns. There are many methods for extracting features from face images to perform face recognition. One of these feature extraction methods is the Local Binary Pattern (LBP) method. With LBP it is possible to explain the texture and shape of a digital image. This is achieved by dividing an image into multiple small regions from which the features are extracted. These features contain binary patterns that the surroundings of pixels in the regions. The obtained features from the regions are concatenated into a single feature histogram, which forms a representation of the image. Images can then be compared by measuring the similarity (distance) between their histograms. According to many studies and research face recognition using the LBP method gives very good results, both in terms of speed and discrimination performance. Because of the way the texture and shape of images is explained, the method seems to be quite robust against face images with different face expressions, different lightening conditions, image rotation and aging of person. The main intention is that for every pixel of an image the LBP-code is calculated. The occurrence of each pattern in the image is kept up. The histogram of such patterns, also called labels, forms a feature vector, and is thus a representation for the texture of the image. These histograms can then be useful to measure the similarity between the images, by determining the distance between the histograms.

2a **2b** **2c**

Fig 2a.Original image. 2b.Only pixel with uniform patterns. 2c.Only pixel with non-uniform patterns

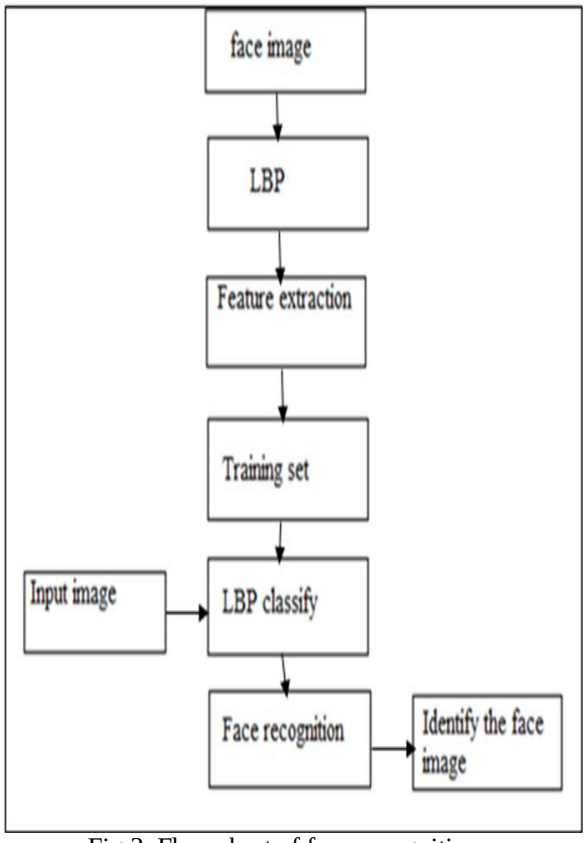

Fig 3. Flow chart of face recognition.

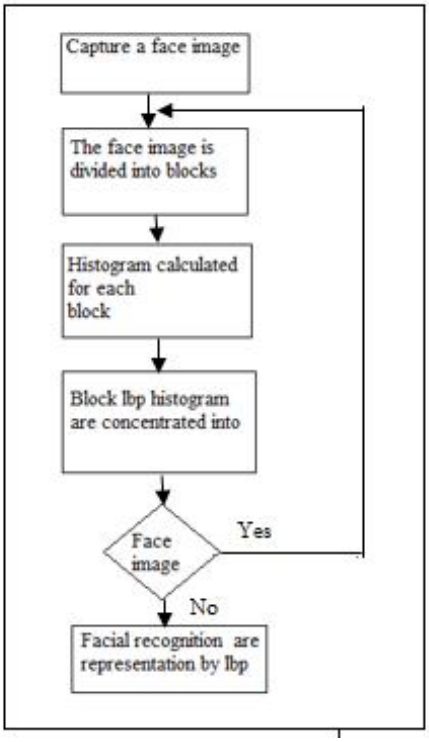

Fig 4. Flow chart for LBP process

2) In case of prevention of an accident:

To prevent accidents there is speed control system which will maintain the same distance between the car in front all the way by adjusting the speed of the car according to the car in front. This will always prevent dashing of car. This speed control is prototyped by controlling the speed of DC motor. Whenever the car reaches close to other car or obstacle it will reduce and match speed to maintain safe distance.

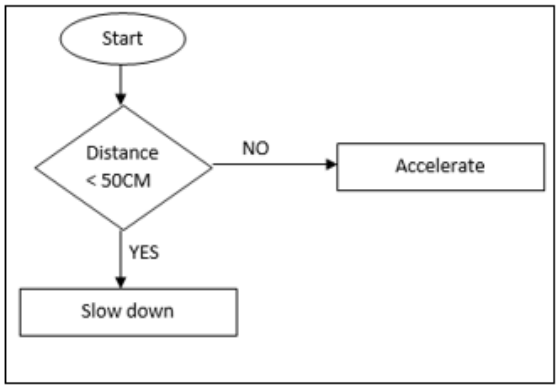

Fig 5. Flow chart for accident control.

3) In case of power generation:

For power generation the motion of the gases from exhaust will produce current which will charge battery of the car. Whenever the car starts the charging will start. It consists of blades or fan, shaft and DC motor or electricity generator. Whenever there is flow of gases from exhaust pipe the motion of gases will rotate the blades of fan. This will create more blade pressure and the blades will move faster with more amount of gases realizing out.

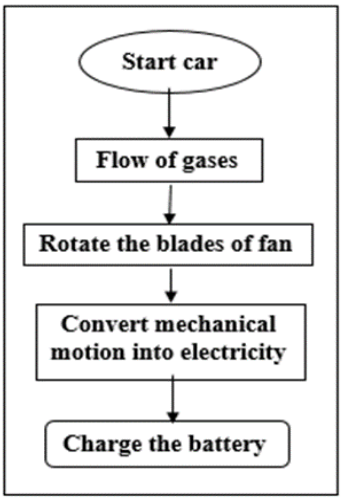

Fig 6. Flow chart of power generation

Due to this the shaft will rotate and the mechanical energy will be converted into electricity by electricity generator or DC motor and supply to the battery to charge it

VII. RESULTS

1. Antitheft using face recognition

The output window shows the face captured and detected by LBP algorithm. The algorithm extracts features of face and compares them with the face images in the database. After detection the car will provide access to the user. Access to unauthorized user is not provided after face detection**.**

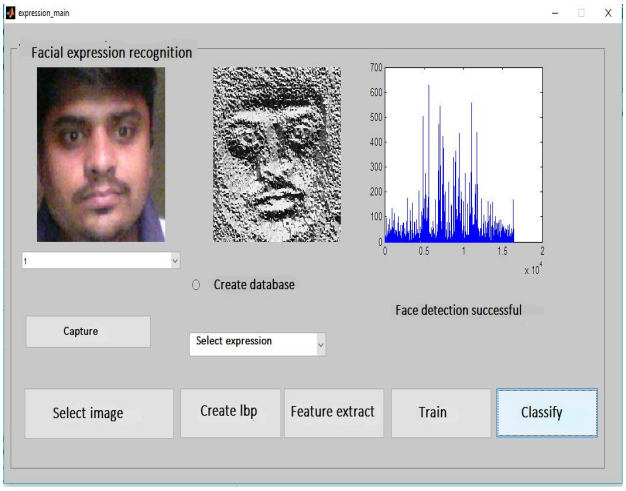

Fig 7.Output window for face recognition

There is also alternate access feature to the car which includes password and message. Whenever correct password is entered access to the car is provided. If incorrect password is typed for three times then the GSM in car sends message to owner about the location and theft of the car. Access to car is also provided by sending start and stop message to the vehicle.

2. Accident control using speed control

The accident control system controls the speed of vehicle. Whenever our vehicle is 50 cm away from vehicle in front, the speed of our vehicle varies according to the speed of vehicle in front and avoids collision. The ultra-sonic sensor will detect the obstacle or car and calculate the distance between our car and the car in front. The ultra-sonic sensor has a transmitter and a receiver. The transmitter will transmit radio waves which will reflect back from the obstacle or car. The receiver will receive the incoming wave to calculate the distance. The voltage to the motor is supplied in increasing rate when the distanced of the car in front increases also when the distance between cars reduces, the voltage rate to the motor also decreases.

3. Power generation

The exhaust pipe contains a fan with generator. The fan has axel which is attached to the generator. The generator is a DC motor. It has a coil which is conducting. The coil has a commutator of which one end is connected to positive supply and the other to negative. This coil is placed between two magnetic poles which are south and north. Magnetic field is created between them so whenever the coil rotates between the magnetic field the current gets induced coil. This current can be given to battery which can power the internal accessories of the car. So whenever there is flow of exhaust gases the fan rotates and the generator converts mechanical energy into electrical energy. This power can be supplied to the battery which in turn can provide battery backup and run internal accessories of car.

VIII. ADVANTAGES

1) Vehicle theft actions will become less.
2) Motion of the waste gases is used to generate power and charge battery.
3) Speed control helps to prevent accidents as much as possible.

IX. APPLICATIONS

It can be implemented in any four wheeler or heavy vehicles.

X. CONCLUSION

This project helps to develop a user friendly vehicle for the current and next generation. All the aspects such as power generation, accident prevention and antitheft systems are well developed. Antitheft system based on face recognition is accurate and reliable. The project will help to efficiently use the waste power to generate energy. Speed control system is very useful to prevent the accidents on highways where vehicles travel at great speed.

FUTURE SCOPE

This project can always be modified and developed to add some more safety and comfort facilities so that user can experience a new world of vehicle. In coming future there will be lots of traffic and many cases of vehicle robbery so this system will be very helpful. As the motion of gases produces energy Heat energy can also be used to generate power inside car.

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